Year	*Month.*	*Hour.*	*Barometer.*	*Temperature.*
1873.	October 27.	4:00 P. M.	30.23.	46°
1874.	" 31.	5:00 P. M.	30.14.	49°
1875.	" 9.	9:30 P. M.	29.93.	49°
1876.	" 9.	4:30 P. M.	30.00.	65°
1877.	" 19.	8:00 P. M.	29.86.	47°

Sunsets.—The characteristics of the sky at sunset, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from 123 stations show 3,682 observations to have been made, of which 37 were reported doubtful; of the remainder 3,140 or 85.3 per cent. were followed by the expected weather.

Sun Spots.—Monthly record of observations by Mr. D. P. Todd, Nautical Almanac office, Washington, D. C., communicated by Prof. S. Newcomb, U. S. Navy, in charge of that office:

Nov., 1878.	No. of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Remarks.
	Groups	Spots.	Groups	Spots.	Groups	Spots.	Groups	Spots.	
1st, 4 p. m...	0	0	0	0	0	0	1	1	
2nd, 4 p. m...	0	1	0	0	0	0	1	2	
4th, 3 p. m...	0	0	0	0	0	0	1	1	
5th, 3 p. m...	0	0	0	0	0	0	1	1	
7th, 4 p. m...	0	0	0	0	0	0	1	1	
8th, 4 p. m...	0	0	0	0	0	0	1	1	
9th, 4 p. m...	0	0	0	0	0	0	0	0	
12th, 4 p. m...	0	0	0	0	0	0	0	0	
13th, 4 p. m...	0	0	0	0	0	0	0	0	
14th, 3 p. m...	0	0	0	0	0	0	0	0	
15th, 3 p. m...	0	0	0	0	0	0	0	0	
16th, 2 p. m...	0	0	0	0	0	0	0	0	
20th, 1 p. m...	1	2	0	0	1	2	1	2	Faculæ.
23rd, 4 p. m...	0	0	0	0	0	0	0	0	
25th, 2 p. m...	0	0	0	0	0	0	0	0	
29th, 3 p. m...	0	0	0	0	0	0	0	0	
30th, 2 p. m...	0	0	0	0	0	0	0	0	

Mr. John W. James, at Riley, Ill, reports that up to the 28th the sun spot, observed on the 3rd, had not reappeared. Prof. Gustavus Hinrichs, at Iowa City, Iowa, one very large spot observed from the 1st to the 8th. Mr. Jay Harcourt, at Wappinger's Falls, N. Y., observed one spot, on the 3rd, near the sun's centre, slightly below equator, very round and sharply defined; 4th, same spot, slowly rotating, changing its form to the shape of a kidney; 5th, slowly rotating towards the sun's circumference, 21st, 24th and 26th, sun examined, but no spots. Mr. David Trowbridge, at Waterburg, N. Y., examined the sun on the 1st, 2nd, 3rd, 4th, 5th, 9th, 10th, 12th, 14th, 15th, 16th, 24th, 29th and 30th; spots observed from the 1st to 5th, disappearing on the 9th. Mr. H. D. Gowey, of North Lewisburg, Ohio, observed spots on the 2nd, 4th and 6th, disappearing on the 12th by solar rotation; 26th, observed spot which might have appeared by solar rotation.

NOTES AND EXTRACTS.

Altitude of Meteors.—In the *Wochenschrift*, page 304, Torvald Köhl gives the altitude of twelve meteors simultaneously observed at two neighboring stations. Four hundred and eighteen meteors were observed in all, but only for these twelve could altitudes be computed; the results are obtained by Brandes' graphic method, and are as follows:

ALTITUDE IN GEOGRAPHICAL MILES.

No.	At the beginning.	At the end.	No.	At the beginning.	At the end.
1	10	11.6	7	—	14.0
2	15	12.8	8	—	5.0
3	—	9.3	9	16	—
4	—	10.9	10	11	7.0
5	—	18.0	11	11.5	10.0
6	—	13.6	12	15.25	18.5

Photographing the Clouds.—In a letter to the European Meteorological Congress, (*Wochenschrift*, p. 327,) Dr. Hildebrandsson urges universal attention to the motions of the upper and lower clouds, and adds: "The various forms of the clouds are, without doubt, of great interest, and their earnest study will certainly lead to important discoveries. But we must photograph the various forms of the clouds on a large scale, at different points in Europe, and note the different atmospheric conditions under which they occur. The studies executed in Upsala, with the assistance of an experienced photographer, have convinced us that these pictures can be taken in the majority of cases, even when the apparent motion of the clouds is very considerable. But it is, then, imperative to use extraordinarily sensitive plates, so that the time of exposure may last only a portion of a second. This is also the case when one would obtain good pictures of the small transparent cirrus clouds, whose photographic effect is but little different from that of the blue light of the sky. In this way we have, at Upsala, obtained an interesting series of photographs, which show how one form of cloud gradually passes over into another form." The Observers of the Signal Service have, since Nov. 1, 1870, made three daily simultaneous observations and reports of the direction of the winds and of the directions of movement of upper clouds at the different stations throughout the United States for purposes of study. In 1871 photographs of clouds were taken by the photographer employed at this office in connection with the meteorological instruments. In May, 1872, Assistant Cleveland Abbe,

A. M., of this office, reported the results of an especial examination and comparison of the direction of movement of the wind and the direction of upper cloud movement, as reported from the stations, and appearing on the manuscript charts of the office, thrice daily, for the period from January 1, 1872, to May 1, 1872, and later, in 1875, a further report on the subject was made by him, by direction of the Chief Signal Officer. The facts so ascertained and reported being, in effect, coincident with the facts announced, as to the different directions of movement of upper and lower air currents, by Buchan, Ley, Hildebrandsson and others. The field of study in the United States is large, and affords unusual advantages for studies of this description.

Increase of Temperature with Altitude.—M. Alluard communicates to the Paris Academy some of his experiences on the summit of the Puy de Dome, (4,850 feet.) He finds a great hindrance in the frost, which forms as readily as on Mt. Washington or Pike's Peak. He is planning to secure a large number of temporary stations at different altitudes in the neighborhood of Puy de Dome, and thus study horizontal sections of the earth's atmosphere. He finds not only occasional instances in which the temperature at the summit is higher than at the base, as has already been found to be the case at very many other stations, but so frequently does this occur that even the monthly means exhibit similar anomalies. The minimum night temperatures at the base are frequently 12½°, Fahrenheit, lower than at the summit; the maximum day temperatures show no such anomalies. He concludes that the rate of diminution of the temperature with altitude is very different during the day from the rate during the night, and hopes that future observations will give some clue as to the reason therefor.

A New Thermometer.—Joubert has determined very carefully the effect of heat in altering the rotatory power of quartz for polarized light. His experiments were made at temperatures of from —20° C. [—4° F.] to +1500° C. [2732° F.] Through which enormous range quartz proves to be exceedingly sensitive, and he proposes to reverse the problem and use the rotatory power of quartz as the best thermometer, convenient and comparable at all temperatures, that has yet been discovered. (Paris C. R., p. 499.)

Sun Spots and Terrestrial Meteorology.—Mr. J. A. Broun communicates to *Nature* (vol. 19, p. 6,) an investigation of the question does the barometric pressure vary in a decennial period; he examined particlarly the observations made in India since 1841, and presents the following conclusions: (1) The years of greatest and lowest mean annual barometric pressure are probably the same for all India. (2) Therefore the apparent relation to the decennial (sun spots) period found by Mr. Chambers for Bombay holds for all India. (3d) The annual oscillations of monthly mean pressure and monthly mean temperature (the amplitude of the annual variations) have nearly a constant ratio in India. (4) These oscillations depend on local conditions in the same latitude at places quite near each other, which are independent of the heat emitted by the sun. (5) The yearly mean isobars run parallel to the equator in India, and are independent of local conditions. (6) The yearly mean isotherms vary in their direction with local conditions. (7) There is no relation between the variations of yearly mean temperature and yearly mean pressure.

Solar Radiaton.—W. Stanley Jevons communicates to *Nature* (Vol. 19, p. 35) a memoir, enumerating a very full list of commercial crises compared with the solar-spot periodicity, and adds: "I should point to the necessity of at once undertaking direct observations of the varying power and character of the sun's rays. There are hundreds of meteorological observations registering at every hour of the day and night the most minute facts about the atmosphere; but that very influence upon which all atmospheric changes ultimately depends, the *solar radiation,* is not, I believe, measured in any one of them, at least not in the proper manner." The various methods proposed by Pouillet, Herschel, Crova, Violle, Govi, Weber, Erman, Ericsson, Draper, Marie Davy, and many others offer to physicists a wide range of investigation into this important subject, which has certainly been neglected in the increasing demands upon meteorologists for weather predictions and practical results.

Edison's Tasimeter and Carbon Telephone as a Barometer or Hygrometer.—At the London Physical Society, November 9th, Professor W. F. Barrett stated that on replacing the hard rubber cylinder of the Edison tasimeter by a strip of gelatine varnished on one side it was found that a very slight change in the hygrometric state of the atmosphere can be detected by the absorption of moisture, causing expansion of the gelatine. By connecting the carbon button with an aneroid box the tasimeter becomes an aneroid baroscope; before any accurate measurements can be made, however, we must investigate more carefully the resistances of the button.

The Origin of Atmospheric Electricity.—Prof. Edlund of Stockholm communicates to the Swedish Academy the result of his researches upon "Unipolar induction," in which he has apparently made great progress towards the discovery of the origin and laws of terrestial magnetism, earth currents and terrestrial and atmospheric electricity. Although Edlund treats this subject by developing it in connection with his well known theory of the physical nature of that what we call electricity and magnetism, yet apart from this theory we may obtain some idea of his views in the following synopsis. The magnetic condition of the earth, as shown by observations upon its surface, may be approximately represented by assuming the existence of a great magnet somewhere in its interior and whose axis is inclined to the earths axis. Now the laws according to which a magnet acts upon magnetic bodies and magnetic or galvanic currents in its neighborhood can be clearly expressed in mathematical formulae agreeably to the known laws of magnetism and electricity, and Edlund finds that if we assume as we know is the case, that the magnetic earth is a good conductor of electricity then its action upon the moving atmosphere of oxygen, nitrogen and aqueuos vapor (which is also slightly magnetic and of which the vapor is a better electric conductor than the gas,) leads to the following rather rigorous deductions. (1) The earth will be negatively electrified. (2) Its potential will be everywhere the same. (3) The atmosphere will be positively electrified. (4) The general equilibrum between atmosphere and earth takes place either by continuous curreuts or by discharge, but is hindered by the poor conductibility of the air and can take place only when favoring circumstances combine. (5) The atmospheric positive electricity will be strongest toward the equator and feeblest toward the poles. (6) Near the poles the negative electricity of the earth may even be, by dissipation, so distributed throughout the lower atmosphere as to feebly negatively electrise the air, as observed by Wijkander. (7) Owing to the feeble electrisation of the air in arctic regions, and to the absence of any opposition due to unipolar induction, there can be little or no lightning there, while thunder-storms will be most frequent in the equatorial region, where the resistances and potential are greatest. (8) The discharge by continuous current or aurora takes place in directions parallel to the free hanging magnetic needle. (9) At and near the magnetic pole itself the resistances to discharge are so slight, and the discharges are so favored by induction, that not even auroral light is produced. (10) The disruptive discharge between two bodies cannot take place except they be good conductors and be separated by a poor conductor; the dry air is the latter while water or the mass of particles of fog, and large drops of rain form good conductors. (11) By induction a negative cloud may exist in any locality, although the average condition of the atmosphere is positive. (12) The region of most numerous auroras must occupy a circle about the pole at such distance that the positively electrised particles of air flying northward are just able to overcome the atmospheric resistances and those arising from unipolar induction, which latter diminish with increasing latitude; this is also a zone in which the inclination of the magnetic needle is everywhere the same. (13) The direction of auroral coronæ should coincide only approximately with the magnetic needle, because the earths axis of rotation does not agree precisely with the magnetic axis. (14) The aurora should be most frequent where thunder-storms are least frequent. (15) The perpetual interchange of currents of electricity going to the poles through the atmosphere and returning to the equator through the earth produces a slight disturbance of the magnetic needle fully accounting for annual, daily and irregular variations. (16) Similar irregularities are produced by the varying conductibility of the atmosphere due to the variable quantity of its moisture. (17) The secular changes in the magnetic needle and atmospheric electricity appear to be due to causes outside of the earth.

Apparatus for Recording Atmospheric Electricity.—An apparatus for maintaining an almost continuous record of the atmospheric electricity has been invented by Mascart, the Director of the French Bureau Central de Meteorologie, and has performed satisfactorily during several months at the Paris Exposition. Mascarts apparatus is described by Angot (*Le Nature*, p. 371). It is contemplated to establish these instruments in several different portions of France, and to study the laws of atmospheric electricity.

Moonsoons and Hurricanes of the Indian Ocean.—W. Wagner, chief of the first sub-section of the *Deutsche Seewarte*, communicates to the *Annalen des Hydrographie* a comprehensive review of our knowledge on this subject as contained in the works of Blanford, Meldrum, Wilson, Eliott, &c. From Wagner's memoir we extract the data given in the following table, showing the average characteristics of the hurricanes, cyclones or typhoons of Asia and India:

Locality.	Hurricanes most frequent.	Duration of progress.	Duration.	Rotation of wind.	Diameter.
Sea of China......	September and October.	Toward W. and NW. when north of 20° N. lat. Toward S. and SW. when south of 20° N lat.; but exceedingly irregular and especially so between China and Japan and north of Formosa.	Eight to twelve hours; usually less.	Opposed to motion of hands of watch.	60 to 240 knots.
Bay of Bengal....	April, May, June, October, November, December.	Toward W. and N.	Several days.	Opposed.	100 to 300 knots; inner calm space 20 knots.
Arabian Sea.......	Very seldom.	* * * * * *	* *	* *	* * *
Southern Indian Ocean or Mauritius..............	February and March.	Toward WSW.; then S. and SSE., and finally SE.		Same as watch hands.	9–10 knots per hour for the fastest; 7–12 knots per hour for the slowest.

* Probably similar to those in the Bay of Bengal.

Barometric Pressure in Asia.—Dr. W. Köppen, of the *Deutsche Seewarte*, communicates to the *Annalen* an endorsement of Woeikof's statement, based on the preliminary result of the levelling across Siberia, according to which the altitudes of meteorological stations are greater by from 60 to 72 meters than has been hitherto accepted; therefore the mean barometric pressure, reduced to sea-level, is increased even more than was formerly assumed by Woeikof and Buchan.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

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